Table 1 Randomized Controlled Trials

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ARTICLE AND AUTHORS** | **YEAR AND DESIGN OF STUDY** | **INTERVENTION** | **OUTCOME MEASURED** | **RESULTS** | **CONCLUSIONS** |
| (19) Effect of strengthening versus balance -proprioceptive exercise on lower extremity function in patients with juvenile idiopathic arthritis: a randomized, single-blind clinical trial.  Baydogan SN, Tarakci E, Kasapcopur O. | 2015  single- blind | 30 patients with JIA participated in this study.  Subjects were randomly assigned to the strengthening exercise group (group 1 n= 15) and proprioceptive-balance exercise group (group 2 n= 15).  Frequency:  -3 days/wk, supervised by a physical therapist at the hospital  - remaining days, supervised by parents at home  -12 wk period.  Duration:  45 min | Pain  Passive ROM  Muscle strength  Balance  Functional abilities  Instruments: Numeric Rating Scale, goniometer, handheld dynamometer, Flamingo balance test, Functional Reach test, 10 meter walking test, 10 stair climbing test, CHA questionnaire. | Intragroup analysis showed statistically significant improvements in all outcome measures except muscle strength in the hip and ankle after strengthening exercises in group 1. However, statistically significant improvements were found in all outcome measures after the proprioceptive-balance exercises in group 2. Intergroup analysis showed statistically significant improvement in all outcome measures in group 2 except for the Numeric Rating Scale, Childhood Health Assessment Questionnaire, and passive range of motion scores and hip extension and knee flexion muscle strengths. | This study demonstrates that exercise treatment significantly improves musculoskeletal symptoms in patients with JIA. However, balance-proprioceptive exercises prove to be more effective than strengthening exercises for improving lower extremity function such as walking, climbing stairs, and balance in patients with JIA. |
| (20) Effects of Combined resistive underwater exercises and interferential current therapy in patients with juvenile idiopathic arthritis: a randomized controlled trial.  Elnaggar RK, Elshafey MA | 2015 | 30 children with polyarticular juvenile idiopathic arthritis were assigned randomly into two groups: the control group (n=15) received the traditional physical therapy program (hot packs, range of motion exercises, isometric exercises, hold-relax technique, weight-bearing exercises, gentle stretching, cyclette and treadmill) and the study group (n=15) received resistive underwater exercises (warming up for 5 mins, resistive exercise training for 20 mins, cooling down for 5 mins) and interferential current therapy (15 minutes).  Frequency:  -3 days/wk  -12 wk period.  Duration:45 min | Peak torque of the quadriceps and hamstrings  Pain  Instruments: HUMAC NORM, CSMI testing and Rehabilitation Isokinetic System, VAS | In the control group, all measures showed significant differences after 1 mth except peak torque of left quadriceps and pain levels. In the study group all measures showed significant differences after 1 and 3 mths and there were significant differences between groups after 1 and 3 mths in favour of the study group. | The combination of resistive underwater exercises and interferential current therapy is a potentially valuable treatment for patients with juvenile idiopathic arthritis. |
| (21) Effects of Pilates exercise on health-related quality of life in individuals with juvenile idiopathic arthritis.  Mendonça TM, Terreri MT, Silva CH | 2013  single-blind | 50 patients with JIA were randomly assigned into 2 groups. In group I (n=25), the participants were given a conventional exercise program (warm-up, workout, and cooling-down period) for 6 months. Patients in group II (n=25) participated in a Pilates exercise program for 6 months.  Frequency:  -2 days/wk  -24 wk period.  Duration: 50 min | HRQOL  Pain intensity  Disability  Joint status  Strumenti: Pediatric Quality of Life Inventory version 4.0, VAS, CHA questionnaire, Pediatric Escola Paulista de Medicina Range of Motion Scale | The scores of the PedsQL 4.0 differed significantly between groups, indicating that Pilates exercises increased these scores when compared with the conventional exercise program. Group II participants showed significant improvements in the 10-cm visual analog scale-joint pain, Childhood Health Assessment Questionnaire, and Pediatric Escola Paulista de Medicina Range of Motion Scale. | The use of Pilates exercises had a positive physical and psychosocial impact on HRQOL in individuals with JIA. Future multi centric studies with a follow-up beyond the period of treatment using more objective parameters will be useful to support the results of the present study. |
| (22) Muscle strength, physical fitness and well-being in children and adolescents with juvenile idiopathic arthritis and the effect of an exercise programme: a randomized controlled trial  Sandstedt E, Fasth A, Eek MN, Beckung E | 2013 | 54 patients with JIA were randomized into an exercise (n=33) and a control group (N=21). The exercise programme consisted of rope skipping, muscle strength, core exercises and exercises with free weights for arms.  Frequency:  -3 days/wk  -24 wk period. | Muscle strength  ROM  Balance  Physical fitness  Well-being.  Instruments: handheld device, Grip-it, goniometer, step test, VAS, CHA questionnaire e CH questionnaire. | There were no differences between exercise and control groups regarding muscle strength, grip strength, fitness or well-being. For the exercise group, muscle strength in hip and knee extensors increased after the 12-week exercise programme and was maintained in knee extensors at follow-up. The fitness/exercise programme was well tolerated and pain did not increase during the study. | A weight bearing exercise programme, with muscle strength training with free weights and rope skipping was well tolerated without negative consequences on pain. It improved muscle strength in the legs and can be recommended for children and adolescents with JIA. |
| (23) Efficacy of a land-based home exercise programme for patients with juvenile idiopathic arthritis: a randomized, controlled, single-blind study.  Tarakci E, Yeldan I, Baydogan SN, Olgar S, Kasapcopur O | 2012  single-blind | 81 patients were randomly assigned to an exercise or control group. The exercise group (n = 43) completed a 12-week individually planned land-based home exercise programme once a week at the hospital for 4 days per week. The control group (n = 38) was placed on the waiting list until the end of the study.  Frequency: -1 days/wk, supervised by a physical therapist at hospital  -3 days/wk, supervised by parents at home  -12 wk period.  Duration: 20-45 min . | Functional Status  Functional ability  Pain intensity  Quality of life  Instruments:  6 Minute walking test, CHA questionnaire,VAS, Pediatric Quality of Life Inventory Arthritis Module | Statistically significant improvements were found in all the outcome measures in the exercise group The visual analogue scale score decreased significantly in the control group after 12 weeks. Other than the visual analogue scale score, the changes in the other outcome measures were significant in favour of the exercise group. | The study demonstrated that participating in a 12-week individually planned land-based home exercise programme may result in improved physical function and quality of life in patients with juvenile idiopathic arthritis. |
| (24) Bone health in children and adolescents with juvenile idiopathic arthritis and the influence of short-term physical exercise.  Sandstedt E, Fasth A, Fors H, Beckung E. | 2012 | Fifty-four children with JIA were randomly assigned to an exercise (n=33) or control group (n=21). The program consisted of one hundred 2-footed jumps with a rope and standardized muscle strength core exercises and muscle strength exercises with a load (0.5-2 kg) for the arms and shoulders.  Frequency:  -3 days/wk,  -12 wk period. | Bone mineral density  Bone mineral content  Instruments: dual- energy x-ray absorptiometry DXA e DXA Laser Calscan | Bone mineral density values in total body increased significantly in the exercise group. | Twelve weeks of exercise increases bone mineral density in children with juvenile idiopathic arthritis. |
| (25) Promoting physical activity in children with juvenile idiopathic arthritis through an internet-based program: results of a pilot randomized controlled trial.  Lelieveld OT, Armbrust W, Geertzen JH | 2010  Pilot | 33 eligible patients were included and randomized in an intervention (n=17) or control waiting-list group (n=16).  Internet-based program contained the following elements: health education, benefits of physical activity, influence of family and school is recognized and used to promote physical activity, smart goal are set.  Frequency:  -17 wk period. | Physical activity  Aerobic capacity  Instruments: 7-day activity diary, Bruce treadmill test | Maximum endurance time significantly improved in the intervention group but not in the control group. Physical activity improved in the intervention group but not in the control group. | An Internet-based program for children with JIA ages 8–12 years directed at promoting PA in daily life effectively improves PA in those patients with low PA levels. It is also able to improve endurance and it is safe, feasible, and has good adherence. |